UNITED STATES DISTRICT COURT

DISTRICT OF NEW MEXICO

THE GRAND CANYON TRUST and
SIERRA CLUB,

Plaintiffs,

vs. CV 02-552 BB/ACT (ACE)

PUBLIC SERVICE COMPANY OF
NEW MEXICO,

Defendant.

PROPOSED FINDINGS OF FACT AND CONCLUSIONS OF LAW
OF DEFENDANT PUBLIC SERVICE COMPANY OF NEW MEXICO
FOR LIMITED TRIAL ON LIABILITY

COMES NOW Defendant Public Service Company of New Mexico ("PNM"), through its counsel of record, and pursuant to the Court's Stipulated Order, submits its proposed Findings of Fact and Conclusions of Law with respect to the limited trial on liability. A 3.5-inch floppy disk with these Proposed Findings of Fact and Conclusions of Law in WordPerfect format is submitted to the Court contemporaneously herewith. To the extent that any findings of fact herein are more properly considered conclusions of law, they shall be deemed to be conclusions of law. To the extent that any conclusions of law herein are more properly considered findings of fact, they shall be deemed to be findings of fact.

PROPOSED FINDINGS OF FACT

General Background and Undisputed Facts

1. This is a citizens suit under the federal Clean Air Act, 42 U.S.C. § 7601 through § 7671Q ("CAA"),[1] brought by the Sierra Club and Grand Canyon Trust ("Plaintiffs") against PNM. (Plaintiffs' Complaint)

2. Plaintiffs allege that PNM violated the opacity limit in PNM's Title V Operating Permit P062 ("Operating Permit P062") for Units 1, 3 and 4 of PNM's San Juan Generating Station ("San Juan"). (Plaintiffs' Complaint, Count I)

3. PNM is a New Mexico corporation and is part owner and the operating agent for San Juan, located approximately 15 miles from Farmington, New Mexico. (Huffman; Goodman; Pre-Trial Order Stipulated Facts 1, 2 and 5)

4. San Juan consists of four separate generating units with a cumulative electric generating capacity of approximately 1,600 megawatts. A megawatt is equal to the power of one million watts. (Pre-Trial Order Stipulated Facts 6)

5. San Juan Unit 2 was the first unit completed and commenced commercial operation in 1973. San Juan Unit 1 was completed next and commenced commercial operation in 1976. San Juan Unit 3 commenced commercial operation in 1979. San Juan Unit 4 was the final unit completed and commenced commercial operation in 1982. (Goodman; Huffman)

6. San Juan's generating units are numbered from south to north rather than in terms of construction date. (Huffman; Goodman; PNM-1876; PNM-1877).

---

[1] Hereinafter citations are to the section of the CAA itself.

7. San Juan generates electricity by burning coal in a coal-fired boiler to create steam, and then passing that steam through a turbine to drive a generator that produces electricity. (Pre-Trial Order Stipulated Facts 7; Huffman)

8. San Juan burns over six million tons of coal per year. (Pre-Trial Order Stipulated Facts 8)

9. San Juan Coal Company's San Juan Mine and La Plata Mine, two surface coal mines, previously served as sources for the coal that San Juan burned in its coal-fired boilers. (Huffman; Goodman)

10. The current source for coal used at San Juan is a longwall coal mine at the San Juan Mine adjacent to San Juan. (Huffman; Goodman)

11. Units 1 and 2 at San Juan each have the capacity to produce approximately 350 megawatts of electricity. (Pre-Trial Order Stipulated Facts 9). Units 3 and 4 at San Juan each have the capacity to produce approximately 540 megawatts of electricity. (Pre-Trial Order Stipulated Facts 10).

12. San Juan is PNM's primary electric generation source, providing about fifty-eight percent of the electric power needs of PNM customers in New Mexico. (Huffman; Goodman)

13. PNM, Tucson Electric Power Company ("TEP"), the City of Farmington, New Mexico ("Farmington"), M-S-R Public Power Agency ("M-S-R") (whose members are Modesto, Santa Clara and Redding, California), Los Alamos County, New Mexico ("Los Alamos"), Southern California Public Power Authority ("SCPPA"), the City of Anaheim, California ("Anaheim"), Utah Associated Municipal Power Systems ("UAMPS") and Tri-State Generation and Transmission Association, Inc. ("Tri-State")

each owns an undivided interest in the four units of San Juan with the following percentages of ownership in each unit:

Unit 1 -	PNM - 50%	TEP - 50%
Unit 2-	PNM - 50%	TEP – 50%
Unit 3-	PNM - 50%	SCPPA - 41.8%
	Tri-State – 8.2%	
Unit 4-	PNM – 38.457%	Farmington – 8.475%
	M-S-R – 28.8%	Los Alamos – 7.2%
	Anaheim – 10.4%	UAMPS – 7.028%

(Goodman; Huffman)

14. San Juan has an annual payroll of over $26 million and employs approximately 435 full-time employees. (Huffman; Goodman)

15. More than one-fourth of San Juan's employees is assigned to designing, monitoring or operating San Juan's extensive environmental controls. (Huffman; Goodman)

16. Thirty percent of San Juan's operation and maintenance costs are for pollution control systems. (Huffman; Goodman)

17. San Juan has been certified as an ISO 14001 facility, which is an international certification of adherence to a systematic management approach to environmental compliance by a facility. (Huffman; Goodman)

18. San Juan is also a charter member of the Environmental Performance Track Program under the auspices of the United States Environmental Protection Agency ("EPA"). (Huffman; Goodman)

19. The Performance Track Program is designed to recognize facilities that consistently meet environmental requirements and that have implemented high quality environmental management systems. (Huffman; Goodman)

20. San Juan was awarded the Green Zia award in 2003 by the New Mexico Environment Department ("NMED") in recognition of San Juan's environmental stewardship. (Huffman; Goodman)

Jurisdiction

21. PNM is part owner and the operating agent for San Juan, located approximately 15 miles from Farmington, New Mexico. (Huffman; Goodman; Pre-Trial Order Stipulated Facts 1, 2 and 5)

"Subpart D" Applicability

22. San Juan Units 1, 3 and 4 are fossil-fuel fired steam generating units with a heat input rate greater than 73 MW (250 million Btu per hour). (Huffman; Goodman).

23. Construction on San Juan Units 1, 3 and 4 commenced after August 17, 1971, and before September 18, 1978. (Huffman; Goodman).

The Standard Setting Process

24. Emission standards consist of at least three essential, interrelated elements: (1) the numerical limit; (2) the averaging time; and (3) the compliance measurement method and/or frequency of application. (Roberson)

25. Changing or modifying any one of the elements of an emission standard, without making a compensating change in the other elements, can alter the emission standard. (Roberson)

26. Emission standards developed by regulatory agencies such as the EPA fall into two categories: (1) periodic standards in which evaluation of the performance of the source type and the control equipment is based on periodic "snap shots" of emissions using short term tests (*e.g.*, stack tests, EPA Method 9 data); and (2) continuous standards in which evaluation of the performance of the source type and the control technology is based on data obtained from continuous monitoring. (Roberson)

27. The primary characteristic of a "periodic" standard is that it is developed from the analysis of limited data sets. As a result, periodic emission tests cannot quantify the long-term variability in the operation of the source or in the operation of any control technology. (Roberson)

28. Continuous standards that are based on long-term, continuous emissions data allow the long-term variability of both the source and the control technology to be factored into the establishment of an emission standard. (Roberson)

29. When short-term tests are used to collect the data for "periodic" standards, the compliance method specified for such standards is generally the same periodic test performed under "representative" (but not all) operating conditions. (Roberson; PNM-1830)

30. When continuous data are used to develop "continuous" standards, the continuous measurement technique (*e.g.*, continuous emission monitors known as CEMS)

is generally specified for determining compliance with those standards. (Roberson; PNM-1830)

31. Regulatory agencies are sometimes faced with a situation in which a continuous method for monitoring emissions from a source becomes available long after a standard based on periodic test data has been established. (Roberson)

32. To maintain a consistent stringency of the standard, agencies convert the "periodic" standard to a "continuous" standard before requiring the use of the continuous method for determining compliance. (Roberson)

33. In making this conversion, agencies recognize that the achievability of an emission standard is determined not just by the numerical value of the standard, but also by the averaging time associated with the numerical limit and the method used to make emission measurements. (Roberson)

34. Without proper adjustment of averaging time, numerical value and test method, simple application of the continuous method to determine compliance with a periodic standard could affect its achievability. (Roberson)

35. Agencies generally convert a "periodic" standard to a "continuous" standard by adjusting the averaging time or by providing for *de minimis* relief periods during which excursions above the standard are excused. (Roberson)

36. In one case under the Subpart D NSPS for boilers, when EPA evaluated converting the Subpart D SO_2 standard from a "periodic" standard enforced with periodic "performance testing" using a 3-hour manual reference method test (using EPA Method 6) to a "continuous" standard enforced using data already being reported from SO_2 CEMS, EPA determined that it would be necessary to extend the averaging time for the

existing numerical limit to a 30-day rolling average in order to ensure that the standard was still achievable with what EPA had determined was the "best demonstrated technology." (Roberson; PNM-1824).

Establishment of the Subpart D Standard

37. In the case of a coal-fired power plant such as San Juan, PM emissions are made up primarily of tiny coal ash particles -- referred to as particulate matter ("PM") -- from the combustion process. (Huffman; Farley; Roberson; Nichols)

38. When EPA established the Subpart D PM standard in 1970-71, EPA conducted a review of available PM control technology and determined that the "best demonstrated technology" to control ash particles at the time was the use of an electrostatic precipitator ("ESP"). (Roberson)

39. To determine the level of PM control achievable with an ESP at a coal-fired boiler, EPA conducted PM tests at a handful of sources using stack testing procedures over periods of several hours under what were considered to be "representative operating conditions." (Roberson)

40. Although the conditions under which the PM standard-setting tests were conducted included some specific operating conditions EPA anticipated would occur, they did not (and could not), because of the limited number and duration of tests, include evaluation of all operating conditions and sources of long-term variability. For example, one type of operating condition that apparently was not considered was "ramping." (PNM-1822) Ramping refers to a significant change in unit load to increase or decrease the number of megawatts produced. (Roberson)

41. Because increased PM in a gas stream will generally cause an increase in opacity of that gas stream, measurements of opacity can be a useful surrogate for determining when PM levels are rising or falling. (Roberson).

42. Accordingly, while EPA was collecting PM data to set the Subpart D PM standard, EPA also collected opacity data using manual visual observations. Those limited data sets, collected during PM testing under "representative conditions," provided the basis for the current Subpart D opacity standard. (Roberson)

43. Because the Subpart D PM and opacity standards were both developed as "periodic" standards, EPA promulgated with the final standards specific compliance methods -- Methods 5 (for PM) and Method 9 (for opacity) -- that were consistent with the periodic methods used to develop the standard. (Roberson; PNM-1814; PNM-1830)

44. Although EPA required installation of continuous opacity monitoring systems ("COMS") under Subpart D, EPA made clear in the preambles accompanying rules regarding COMS and other documents that the data from COMS were not to be used to determine compliance, but instead to determine whether the PM control device was being properly operated and maintained and to target inspections. (Roberson; PNM-1814; PNM-1830)

45. EPA eventually developed instructions and checklists in the form of the *Handbook for the Review of Excess Emission Reports*, EPA-340/1-86-011 (May 1986) to aid regulators' review of COMS data and targeting of additional testing and inspections. (Roberson; PNM-1826)

46. EPA has never evaluated what would be required to convert the Subpart D standard to a "continuous standard" that takes into account long-term source and control device variability and data under all operating conditions. (Roberson)

47. Several states that have recently engaged in rulemaking to attempt to adjust their state opacity standards to a format that would allow use of COMS data for enforcement determined that a *de minimis* period of allowed exceedances would be required to ensure that the standard was still achievable, even with a "startup, shutdown, and malfunction" provision. (Roberson)

48. In one of those cases, EPA has proposed to approve revision of the state opacity standard to allow a *de minimis* exclusion, stating that the amendment was "designed to provide sources using COMs the same opportunity to comply with the visible emissions rule as sources that do not use COM devices." (Roberson; 68 Fed. Reg. 33874 (2003)).

EPA Method 9

49. The method historically used by sources and inspectors to measure the opacity of emissions is the periodic method that was used to establish the Subpart D standard and was promulgated as EPA Method 9 with the initial NSPS, in 1971. (Farley; Roberson)

50. EPA Method 9 is performed by a human observer who is trained and certified to perform a visual measurement of the opacity of a gas stream exiting the stack of an emissions source. (Farley; Roberson; PNM-1813G)

51. A valid Method 9 reading requires at least 24 individual 15-second observations (recorded to the nearest 5 percent opacity) which are averaged to obtain test results. (Farley; Roberson; PNM-1813G)

52. Under Method 9 procedures, a plume with a true opacity of up to 22.5 percent during any individual 15-second reading would be recorded as having 20 percent opacity. (Farley; Roberson; PNM-1813G)

53. The Method 9 procedure for certifying observers involves observation of 50 plumes (25 white plumes and 25 black plumes) generated by a smoke generator and comparison of the observers' readings to readings from a "smoke meter," also known as a transmissometer, that is calibrated prior to each smoke reading test. (Farley; Roberson; PNM-1813G)

54. A reader's recorded observations can differ from the recently calibrated smoke meter readings by as much as 15 percent opacity on any single 15-second reading and by as much as 7.5 percent opacity on average (in terms of absolute error) for each category of 25 plumes and pass the certification. Thus, a Method 9 reader performing within the specifications for certification could, in comparison to roughly 2 six-minute COMS readings of 27 percent, report an average value for the same period anywhere between 19.5 percent (reported as 19 percent after rounding) and 34.5 percent (reported as 34 percent after rounding), with the potential differences for a single six-minute period being even higher. (Farley; Roberson; PNM-1813G)

55. Many factors influence plume opacity readings, including particle density, particle refractive index, particle size distribution, particle color, plume background, path

length, distance and relative elevation to stack exit, sun angle, and lighting conditions. (Roberson; Nichols; PNM-1825)

56. As a result, Method 9 contains a number of requirements for conducting opacity readings that inherently limit the frequency at which (and conditions under which) such tests can be performed, such as the requirement that the sun be oriented within a 140° sector to the observer's back. (Roberson; PNM-1813G)

57. When EPA performed tests to evaluate the potential biases in Method 9 under a variety of conditions, EPA found potential biases that were both positive and negative. However, as is EPA's practice, because only positive bias increases the possibility that a source would be cited for an opacity violation due to observer error, EPA limited its discussion in Method 9 to potential positive biases. (Roberson; PNM-1813G)

58. Because Method 9 requires that readings be taken at a point in the plume that is not affected by condensed water vapor, a Method 9 observer reading a plume where condensed water vapor is present as it exits the stack (*i.e.*, an "attached plume) must take the reading at a point in the plume where condensed water vapor is no longer visible. (Farley; Roberson; PNM-1813G)

59. Method 9 tests are typically conducted at a source no more than once or twice per year, often in conjunction with a source's annual PM test. (Roberson)

60. To ensure that tests are properly performed and conditions during the test are representative of normal operation, EPA's Quality Assurance Handbook for Air Pollution Measurement includes a section 3.12 that outlines suggested quality assurance

procedures for Method 9 observers, including determining whether the sources were operating normally at the time of the Method 9 evaluation. (Roberson; PNM-1825)

61. Historically, the NMED has conducted EPA Method 9 Tests at San Juan during annual or semi-annual inspections. (Farley; PNM-1933; PNM-1844)

EPA Method 5

62. The method for determining compliance with the Subpart D PM standards -- EPA Method 5 -- is a periodic manual method of sampling and analysis conducted by a test crew that extracts a sample of gas from the stack and collects a sample on a filter. (Farley; Roberson; Nichols; PNM-1813F; PNM-1814)

63. Because condensed water vapor that forms in the stack is evaporated in the Method 5 measurement process, only those substances that are chemically combined with water are measured as, and fall within the definition of, PM. Water that is not chemically combined (*i.e.*, uncombined water), is not measured as PM. (Farley; Roberson; Nichols; PNM-1813F)

64. When Method 5 testing for PM is conducted under the NSPS it is called "performance testing" and is performed upon initial startup of the unit and periodically thereafter under "representative conditions." (Huffman; Farley; Roberson; PNM-1813D and E).

65. It takes, at a minimum, three hours to conduct the runs necessary to extract the required samples in an EPA Method 5 performance test. (Huffman; Farley; Roberson)

66. Performance testing by means of an EPA Method 5 upon initial startup of the unit following completion of construction confirms that the installed control

equipment will meet the applicable PM standard. (Huffman; Farley; Roberson; PNM-1830)

The Continuous Opacity Monitoring Systems (COMS)

67. PNM monitors and records the opacity of emissions from San Juan Units 1, 3 and 4 on a continuous basis using COMS that are located in the stack of each unit as required in § 60.13. (Pre-Trial Order Stipulated Facts 15)

68. The COMS in the stacks of San Juan consist of transmissometers that continuously measure, except for periods of downtime, the amount of light that can pass through the emissions of the power plant before such emissions are emitted into the atmosphere. (Stipulated Facts 16)

69. The COMS used at San Juan are what are known as “dual pass” units that utilize a light source (or beam) on one side of the stack that is aimed at a mirror on the other side which reflects the light back to a sensor that is co-located with the light source. (Huffman; Farley; Roberson; PNM-1805; PNM-1806; PNM-1874)

70. All measurement systems have error that must be taken into account when evaluating their results. (Roberson)

71. Two primary metrics of data quality are precision and accuracy. Precision can be determined by evaluating the variability in multiple measurements of a stable value. Determining accuracy is more difficult in many cases because it requires knowledge of the actual value to some level of accuracy. And, where there are multiple potential sources of error or bias, those errors are cumulative. The potential error or bias of a measurement system, like a COMS, is the sum of the individual errors or biases. (Roberson)

72. COMS are subject to a variety of potential errors most of which tend to overestimate opacity readings. Causes of potential erroneous COMS readings include misalignment, dirty optics and analyzer drift. (Huffman; Farley; Roberson)

73. The expected precision and accuracy of COMS required to be installed under the NSPS are defined through Performance Specification 1 (PS-1), which establishes criteria for manufacturer design criteria and for installation. (Farley; Roberson).

74. Because the amount of light scatter, and thus an opacity measurement, is affected by the distance over which the measurement is made, PS-1 requires adjustment of the COMS data to reflect the difference between the measurement path length and the path length at the emissions outlet (which is generally taken from engineering drawings rather than actual measurements). Most COMS make these data adjustments automatically based on input values that are established at the time of installation. (Roberson)

75. One of the first tests performed on COMS under PS-1 during initial setup is the calibration error test. In this test, the precision of the COMS is checked by testing the COMS response to optical filters of "known" value. The COMS are tested five times at each of three filter values and the precision of the COMS response is calculated in terms of the variance (or the square) of the standard deviation. PS-1 allows a calibration error of up to 3.0% opacity during this test. The optical filters in turn are calibrated to a device that is accurate to within < 0.5% of another known value. (Farley; Roberson; PNM-1823)

76. After the calibration, COMS are aligned under "clear stack" conditions. Because of the difficulty of obtaining true clear stack conditions, this test may be performed off the stack. Misalignment of the light from the transceiver to the retroreflector results in a positive error. PS-1 requires that the COMS be designed to detect a positive error of 2% opacity during the alignment check. Because rotational alignment is adjusted during preliminary equipment setup to produce the maximum instrument output, any misadjustment during installation or operation on the stack will result in a positive opacity bias. (Farley; Roberson; PNM-1823)

77. Once installed and operated for a period of time, the COMS are tested for drift over 168 unit operating hours. The drift check measures the difference in the COMS response over time to the same filter value. PS-1 allows a drift up to 2% opacity over 24 hours during this certification test. (Farley; Roberson; PNM-1823)

78. PS-1 allows the use of an automatic zero compensation adjustment to account for the effects of dust accumulation on the lenses. The automatic zero compensation electronically resets the instrument response to zero if a non-zero value is obtained. For dual-pass instruments, because dirt accumulation on the transmitter/receiver unit and the dirt accumulation on the reflector unit is assumed to be the same, the correction may not be accurate. (Farley; Roberson; PNM-1823)

79. In addition to potential measurement system error that may be present in any certified COMS, COMS are sometimes subject to specific problems that could result in inaccuracy or bias. (Farley; Roberson)

80. Each of the potential errors described above must be considered in estimating the potential cumulative positive system error reflected in the recorded data from a PS-1 certified COMS. (Roberson)

81. The present COMS in the stacks of San Juan Units 1, 3 and 4 replaced previous COMS that were in place in the stacks since the 1980s. (Huffman; Farley)

82. The COMS on Unit 1 was initially installed around 1979. When that monitor failed in 1998 and PNM was unable to get replacement parts, PNM replaced the monitor with a new monitor installed in the same location. The new monitor was tested in late November 1998. In 2000, that monitor was replaced again due to failure of calibration and contamination tests. The new monitor was put into service on January 17, 2000 and PS-1 certification testing was completed on March 22, 2000. (Huffman; Farley; PNM-1838; PNM-1851; PNM-1852; PNM-1855)

83. The COMS on Unit 3 was initially installed around 1982. The monitor was replaced during an annual maintenance outage in 2000 due to concerns about age and accuracy. The new monitor was put into service on March 11, 2000 and PS-1 certification testing was completed on March 28, 2000. (Huffman; Farley; PNM-1853; PNM-1856)

84. The COMS on Unit 4 was initially installed around 1982. The monitor was replaced during an annual maintenance outage in 1999 due to concerns about age and accuracy. The new monitor was put into service on October 28, 1999 and testing was completed on December 14, 1999. (Huffman; Farley; PNM-1846; PNM-1848)

85. The COMS in each stack of San Juan Units 1, 3 and 4 were located and certified consistent with the requirements of the version of PS-1 that was in effect when the monitors were installed. (Pre-Trial Order Stipulated Facts 17; Farley)

86. The version of PS-1 that was in effect at the time the COMS were originally installed in San Juan Units 1, 3 and 4 in the early 1980s did not prohibit installation of COMS in a location where condensed water is present, and the revised version of PS-1 that was in effect when the current monitors were installed exempted COMS installed at existing locations from a new requirement to provide a location free of condensed water vapor. (Huffman; Farley; Roberson).

87. The COMS at San Juan are installed at a location in the stack where condensed water vapor may be present. (Huffman; Farley; Roberson; Nichols)

88. All of the San Juan COMS are designed with a measurement scale capable of reading up to 100% opacity. Consistent with an NSPS requirement in § 60.13(d)(1), San Juan performs a calibration drift check on the COMS every 24 hours which satisfies the daily drift requirement. The San Juan COMS are designed to automatically readjust the monitor output in response to the allowed daily drift. (Farley)

89. The San Juan COMS also are equipped to make the allowed automatic zero adjustments for dust accumulation. PNM cleans the COMS lenses if the zero compensation reaches the 4% limit on zero compensation. (Farley)

90. PNM attempts to perform a zero alignment and a calibration error test on the San Juan COMS during unit outages, which occur approximately every two years (minor outage) and eight years (major outage), and recertifies the filters used for calibration drift checks and calibration error tests annually. (Farley)

91. San Juan has experienced alignment problems with the COMS at San Juan. (Huffman; Farley)

92. PNM also experienced problems with the COMS readings on Unit 1 in the first quarter of 1999 as a result of an error in the monitor path length, which could have resulted in COMS readings of between five and eight percent higher than actual for the period before March 4, 1999. (Huffman; Farley; Plaintiffs Ex. 2)

93. During the fourth quarter of 1999, the COMS in the stack of Unit 1 also experienced higher than normal opacity readings due to malfunctioning COMS as evidenced by the COMS' failure of the contamination and daily drift tests. (Huffman; Farley; PNM-1850)

94. The COMS at San Juan also operate in some cases when the COMS or associated equipment, such as the data logger or computer are malfunctioning resulting in erroneous COMS data. (Huffman; Farley;)

Quarterly Excess Emissions Reporting

95. The opacity data collected by the COMS at San Juan are retained in a computer. (Pre-Trial Order Stipulated Facts 18).

96. PNM has been reporting these opacity readings to the NMED since the early 1980s in accordance with the excess emissions reporting requirements in Subparts A and D. (Huffman; Farley)

97. The COMS generate printed data showing opacity readings expressed in percentage opacity on a six-minute block average basis to the nearest two decimal places. (Huffman; Farley; PNM-1859)

98. The COMS data relating to opacity readings are collected and reviewed by PNM on a daily basis, usually at midnight. (Huffman; Farley)

99. PNM identifies those readings from the COMS that show opacity in excess of 20 percent for San Juan Units 1, 3 and 4 and submits quarterly reports to the NMED itemizing the readings in excess of 20 percent opacity together with a notation identifying the cause for the elevated reading. (Huffman; Farley; Plaintiffs' Ex. 2)

100. PNM's certification on its quarterly reports to the NMED refers to the fact that the recorded COMS readings are accurately reported to the NMED without deliberate alteration or omission. (Huffman; Farley)

101. The certification on PNM's quarterly reports is not a certification that the COMS are taking error-free readings, that the readings are indicative of a violation of the applicable opacity standard, or that readings indicate what would have been recorded with Method 9. (Huffman; Farley; PNM-1905)

102. Although PNM in some cases has rounded COMS readings to the nearest 1 percent opacity before reporting "excess emissions," PNM's policies on that issue have changed over time and have not been consistently applied. Thus, PNM has reported many readings between 20.0 percent and 20.50 percent ("rounded periods") as "excess emissions" when they in fact are not. (Huffman; Farley)

103. Although PNM in a few cases has excluded the one opacity reading per hour between 20 percent and 27.5 percent ("free periods") to which the standard does not apply, in most cases PNM has not excluded that value but instead reported it as "excess emissions." (Huffman; Farley)

104. In addition, in instances where there are more than one opacity reading in excess of 20 percent in a given 24-hour period, PNM sometimes records the first six-minute period in excess of 20 percent opacity and the last recorded six-minute period in excess of 20 percent opacity and reports that all six-minute periods in between are in excess of 20 percent opacity. (Huffman; Farley)

105. As a result of the foregoing, PNM typically over-reports "excess emissions" of opacity in the quarterly reports submitted to the NMED. (Huffman; Farley; Norem)

106. During the period covered by this suit, PNM experienced significant increases in its opacity measurements and reported "excess emissions" as a result of the measurement of condensed water vapor in the stacks following installation of a new wet limestone SO_2 control device. PNM notified the NMED in both the quarterly excess emissions reports and in separate correspondence that the condensation of water vapor was causing "higher than normal" opacity readings. (Huffman; Farley; PNM-1834; PNM-1840)

107. In January 1999, PNM wrote the NMED with the results of PNM's investigation into a solution to the condensed water vapor issue. (Farley; PNM-1841)

108. In July 1999, PNM informed NMED of its progress in reducing the number of periods of condensed water vapor. (Farley; Plaintiffs' Ex. 2)

109. Over time, PNM has continued to improve operator control to reduce the number of periods of "excess emissions" due to condensed water vapor. (Huffman; Farley; PNM-1904; PNM-1905)

110. PNM's practice of reporting as excess emissions values that are not in fact over the standard reflects the fact that PNM never regarded the COMS readings as the method for determining compliance with the opacity standard. (Huffman; Farley; Norem)

San Juan Title V Operating Permit

111. The State of New Mexico created a Title V operating permit program to which EPA gave final approval on November 26, 1996. 61 Fed. Reg. 60032. (Pre-Trial Order Stipulated Facts 14; PNM-1813J)

112. PNM is the named permittee in Operating Permit P062. (Pre-Trial Order Stipulated Facts 3, 12)

113. PNM was issued Operating Permit P062 on August 7, 1998. (Pre-Trial Order Stipulated Facts 3)

114. Under the terms of Operating Permit P062, San Juan is allowed to emit into the atmosphere on an annual basis approximately 5,000 tons of particulate matter, 38,800 tons of nitrogen oxides ("NO_x"), and 35,800 tons of sulfur dioxide ("SO_2"). (Pre-Trial Order Stipulated Facts 12)

115. Prior to issuance of Operating Permit P062, PNM operated under the terms of a modified preconstruction (New Source Review or NSR) permit ("NSR Permit 63-M-2") issued by the NMED in 1997. (Farley; Norem; PNM-1829)

116. San Juan is still subject to the provisions of NSR Permit 63-M-2 and any significant modification to San Juan would require a modification to NSR Permit 63-M-2. (Norem)

117. Operating Permit P062 sets out the Subpart D opacity standard of 20 percent except for one six-minute period per hour of not more than 27 percent opacity in Condition 3.2.1. (Farley; Norem; Plaintiffs' Ex. 2)

118. PNM's Operating Permit P062 incorporates by reference Condition 1.9 of NSR Permit 63-M-2 as follows:

> 1.9 The following conditions of NSR permit number 63-M02 are incorporated into this permit [Operating Permit P062] by reference:
>
> Condition 1- Modification and Operation;
>
> Condition 2- Emissions Rates (except entire facility emissions limits);
>
> Condition 5- Reporting
>
> Condition 6- Compliance Test Methods
>
> Compliance with this permit [Operating Permit P062] is sufficient to comply with the other terms of that NSR permit . . . .

(Plaintiffs' Ex. 2)

119. Condition 1 of NSR Permit 63-M-2 as incorporated by reference into Operating Permit P062 states that Units 1, 3 and 4 are subject to :

> Part 60. Subpart A – General Provisions, and Subpart D and shall comply with both the notification requirements in Subpart A and the specific requirements in Subpart D.

(PNM-1829)

120. Condition 6 of NSR Permit 63-M-2 as incorporated by reference into Operating Permit P062 states that compliance tests:

> . . . shall be conducted in accordance with . . . Method 9 and the procedures for opacity, contained in CFR Title 40, Part 60, Appendix A, and with the requirements of Subpart A

(PNM-1829)

121. The Statement of Basis created by the NMED to accompany Operating Permit P062 clearly identifies Method 9 as the "Testing" method for the Subpart D opacity standard. (Farley; Norem; PNM-1870)

122. Operating Permit Condition 3.4.2.1 provides that "[f]or opacity in order to demonstrate compliance with 40 C.F.R. 60, Subpart D, Section 60.42(a) 2, opacity shall be continuously monitored in accordance with Section 60.45(a)." (Plaintiffs' Ex. 2 at 15-16)

123. PNM did not object in its comments to Condition 3.4.2.1 because it was not inconsistent with PNM's practice of using COMS data to determine compliance with the opacity standard during periodic PM performance testing (in lieu of an EPA Method 9

test) as provided in § 60.11 and the NMED's historical practice of using COMS data to determine if additional Method 9 testing should be requested. (Huffman; Farley; Norem)

124. PNM did not comment on the NMED's failure to include a separate permit term documenting the "startup, shutdown, malfunction" provision in Subpart D because PNM understood that exclusion to be an integral part of the standard that could not be eliminated through Title V. (Huffman; Farley; Norem)

125. The NMED never suggested to PNM prior to the filing of the present action that the COMS were the primary method of determining compliance with the applicable opacity standard under Operating Permit P062, or that the Subpart D "startup, shutdown, and malfunction" provision no longer applied. (Goodman; Huffman; Norem; Farley)

126. On many occasions following issuance of Operating Permit P062, NMED reviewed PNM's "excess emissions" reports and determined that San Juan was in "compliance" despite the reported exceedances. (Huffman; Farley; Norem; PNM-1835; PNM-1843; PNM-1845; PNM-1854; PNM-1857; PNM-1865)

127. On one occasion, in June 2000, after reviewing PNM's "excess emissions" reports, NMED responded by requesting follow-up PM testing and then determined upon review of the PM test reports that San Juan had "satisfied their permit and regulatory requirements" despite the reporting those and other exceedances. (Huffman; Farley; Norem; PNM-1858; PNM-1862)

San Juan Control of SO_2 Emissions

128. San Juan Units 1, 3 and 4 employ what is known as a wet flue gas desulferization ("FGD") system to remove sulfur dioxide ("SO_2") from air emissions. (Huffman; Farley)

129. The FGD system used at San Juan is referred to as a wet limestone system because it works by spraying a reactive slurry of water and calcium carbonate into the hot gas stream from the coal-fired boilers. The reactive slurry reacts with the SO_2 in the flue gas and removes it from stack emissions. (Huffman; Farley; PNM-1801)

130. The wet limestone system at San Juan replaced the original Wellman-Lord system that did not use limestone slurry for SO_2 removal. (Huffman; Farley)

131. The wet limestone system became operational in mid-1998 and cost approximately $75 million to construct and install. (Huffman; Farley)

132. The FGD currently removes in excess of eighty percent of the SO_2 emissions compared to a removal rate of about fifty percent with the prior Wellman-Lord system. The less flue gas that is bypassed around the scrubber, the greater the SO_2 removal will be. (Huffman; Farley)

133. When PNM operates the FGD for maximum SO_2 removal efficiency, there is more condensed water vapor in the stack that is measured as opacity by the COMS. (Huffman; Farley)

San Juan Control of PM Emissions

134. San Juan Units 1, 3 and 4 comply with the Subpart D and PM and opacity standards by controlling PM with pollution control devices known as electrostatic precipitators ("ESPs"). (Huffman; Farley)

135. San Juan uses what are known as “hot side” ESPs meaning they are designed and installed to intercept ash particles in the hot gases from the coal-fired boilers. Hot-side ESPs are installed between the boiler economizer and the air heater and operate at temperature conditions of approximately 700-850 degrees F. (Huffman; Farley; PNM-1790)

136. Hot-side ESPs were designed to overcome high resistivity ash properties common with low sulfur coal ash. Hot-side ESPs can experience many mechanical problems due to the large amount of expansion and contraction caused by the high operating temperature. (Huffman; Farley)

137. There are two ESPs for each generating unit. The ESPs separate fly ash particles from the flue gas stream by electrostatic attraction of the particles to charged electrodes. (Huffman; Farley)

138. San Juan’s ESP is what is commonly called a "wire and plate" design. This type of ESP is essentially a very large box filled with a series of wires (discharge electrodes) and plates (collection electrodes). Rows of vertical parallel collecting panels form the gas passages. Suspended in the center of the passages and insulated from the collecting panels is a series of weighted, negatively-charged wires which make up the high voltage discharge electrode system. As particles in the gas stream pass the high voltage discharge electrodes, they receive a negative charge and are attracted to the positively charged collecting surfaces. (Huffman; Farley; PNM-1797; PNM-1798)

139. The dust layer that collects on the plate has to be removed periodically and this job is accomplished by plate rappers. At timed intervals, the plates are rapped either

from the top or end and this action dislodges the ash layer, which falls by gravity into ash collection hoppers below the ESP. (Huffman; Farley; PNM-1798; PNM-1799)

140. The fly ash collected in the hoppers is removed by the fly ash system. The fly ash removal system is designed to collect dry fly ash from the steam generator economizer and ESPs and pneumatically convey it to the fly ash storage bin. The dry fly ash is removed from the storage bin disposal in coal mines located near San Juan. (Huffman; Farley; PNM-1800; PNM-1802).

141. ESPs do not remove the water vapor component from the gas stream. (Huffman; Farley; Nichols)

142. The ESPs at San Juan are up to 99.7% efficient in the removal of PM from power plant emissions during normal operating conditions. (Huffman; Farley)

Unit Startup

143. ESPs of the type installed at San Juan cannot be energized until the unit achieves certain “operating benchmarks” related to (among other things) ESP temperature, flue gas flow rates and the like. (Huffman; Farley; Roberson)

144. As a result, elevated opacity readings can result between the time a coal-fired boiler is first started and the time that the ESPs are energized to control PM. (Huffman; Farley; Roberson)

145. This period of time before energizing the ESPs is part of the “startup” process. (Huffman; Farley; Roberson)

146. It may take from between two to forty-eight hours for a coal-fired unit to complete the startup process. (Huffman; Farley; Roberson)

147. No. 2 fuel oil is used during startup to warm the coal-fired boiler slowly. Because the boiler is cold, the oil does not burn efficiently resulting in high carbon in the oil fly ash and even raw oil carryover. (Huffman; Farley; Roberson)

148. The high carbon content of the oil fly ash (as well as unburned oil) combined with the potential of sparks from the ESP present a danger of a fire or explosion so that ESPs cannot be used safely under these conditions. (Huffman; Farley; Roberson)

149. During the startup process the unit has not generally reached normal operating temperatures required for "hot-side" ESPs resulting in lower electrical resistance in the ash particles. (Huffman; Farley)

150. This lower resistance results in lower ESP efficiency in the removal of the PM. (Huffman; Farley)

Unit Shut Down

151. The coal-fired units are generally shut down using a controlled and methodical process that can last two or more hours. (Huffman; Farley; Roberson)

152. It can take approximately twelve hours for a unit to completely cool down after the shutdown process. (Huffman; Farley; Roberson)

153. The shutdown process results in lower unit temperatures which causes lower ESP efficiency and a potential increase in PM emissions and a corresponding increase in opacity readings. (Huffman; Farley; Roberson)

Malfunction

154. Other causes of elevated opacity readings for San Juan Units 1, 3 and 4 are malfunctions in equipment and processes in the power plant. (Huffman, Farley, Roberson)

155. A coal-fired generating station is a very complex array of integrated systems and equipment. (Huffman, Farley, Roberson)

156. The electric generation process involves coal handling, coal preparation, pre-combustion, combustion, pollution control and monitoring of operations and emissions. (Huffman, Farley, Roberson)

157. A malfunction in any one of several of the complex systems involved in the electric generation process can result in elevated opacity readings. (Huffman, Farley, Roberson)

158. Malfunctions in the COMS can likewise result in falsely elevated opacity readings. (Huffman, Farley, Roberson)

Water Droplet Formation And Effects on Opacity

159. A primary cause of elevated opacity readings at San Juan is the water vapor in the stack that condenses to form small water droplets that are measured by the COMS as opacity. PNM refers to this phenomenon as condensed water vapor, water droplets, or a saturated stack condition. (Huffman, Farley, Roberson, Nichols; PNM-1906; PNM-1907; PNM-1908; PNM-1909; PNM-1910; PNM-1911)

160. The flue gas from the boiler enters the wet limestone scrubber system around 300˚ F and leaves the scrubber saturated with water vapor. Although the scrubber system includes what is referred to as a mist eliminator, some of the liquid slurry droplets are likely to be small enough to pass through that device. As a result, in addition to the

water vapor, the flue gas leaving the scrubber also likely contains some liquid slurry droplets. (Nichols)

161. A portion of the untreated flue gas is bypassed around the wet limestone system in order to mix with and reheat the flue gas leaving the wet limestone system to ensure that the gas rises in the stack. This bypass gas is also used to raise the flue gas temperature above the water vapor saturation temperature. (Nichols; PNM-1790; PNM-1794; PNM-1803; PNM-1804)

162. The less flue gas that is bypassed around the scrubber, the greater the SO_2 removal will be. (Huffman; Farley; Nichols)

163. If the amount of bypass is not sufficient to raise the flue gas temperature above the water vapor saturation temperature, the water vapor will condense in the stack. Condensation can occur at almost any point in the ductwork or stack downstream of the scrubber, including before the COMS location, at the COMS location, or after the COMS location. (Nichols; PNM-1807; PNM-1808)

164. The phenomenon of condensation is the same whether the end product is dew, rain, snow, ice, or fog. There is an upper limit to the amount of water vapor that can exist in a gas stream that is a function of temperature and to some degree the pressure of the gas stream. In order to condense, vapor requires a previously formed substance upon which to physically condense. Rain, hail, sleet, snowflakes, and fog form by condensing on sub-micron particles that are suspended in the atmosphere. These condensation nuclei can be minute dust particles, pollen, salt, sulfate particles, or other sources. (Nichols)

165. The primary condensation nuclei in power plants, like San Juan, that burn low sulfur coal are the sub-micron fly ash particles not collected by the ESP. Although

the condensed water vapor physically adheres to those particles, they are not chemically combined with the water. This is what is referred to as "uncombined water" under the NSPS definition of PM and it would evaporate before being read under Method 5 or Method 9. (Nichols)

1. Power plants combusting coal will also have some amount of acid gas (such as sulfur trioxide or SO_3) in the gas stream. Between 0.4% and 1% of the SO_2 in a gas stream will oxidize into SO_3. SO_3 in turn will chemically combine with water vapor to form H_2SO_4, which does not evaporate in a Method 5 train and thus would be measured as PM and seen with Method 9. However, for units like San Juan that burn low sulfur fuel, the amount of SO_2 in the gas stream is already so low that the amount of SO_3, and subsequently H_2SO_4 acid droplets, will be negligible as compared to the amount of condensed, uncombined water. Such acid droplets typically condense in flue gas at much higher temperatures (*e.g.*, above 250˚F) and thus would not be a major component in an increase in opacity that was see at lower temperatures. (Nichols)

167. To minimize the amount of condensed water vapor in the stack, the plant operator attempts to adjust the amount of bypass gas to maintain a temperature above saturation while still maximizing the amount of SO_2 removal. (Huffman; Farley; Nichols;)

168. The plant operator determines how much flue gas to bypass by monitoring the output from a temperature monitor (or thermocouples) located in the stack. However, the adjustment process is slow and condensation can be difficult to control if the flue gas is very close to saturation. During periods of operation at or near moisture saturation, the thermocouple readings can be affected by condensation and moisture droplets and a plant

operator reacting to those readings may end up providing either too much or to little bypass until the thermocouple readings stabilize. The difficulty of controlling the condensation process becomes even more difficult during startup, shutdown, or load changes. (Huffman; Farley; Nichols)

169. Although COMS can measure the translucency of gases, COMS cannot discern what is causing the opacity. Specifically, COMS cannot distinguish between light attenuation (or scatter) caused by condensed water vapor and light attenuation (or scatter) caused by PM in the flue gas. (Farley; Roberson).

170. When conditions at the COMS location in the stacks for San Juan Units 1, 3 and 4 are such that the moisture in the stack gases condenses (to form water droplets) it is akin to having fog in the stacks. (Huffman; Farley; Roberson; Nichols)

171. The COMS read the condensed water vapor or water droplets in the stacks as opacity. (Huffman; Farley; Roberson; Nichols)

172. Saturated stack conditions can occur at San Juan when the flue gas or emissions temperature conditions are anywhere between 115˚F and 135˚F. (Huffman; Farley; Roberson; Nichols; PNM-1839)

173. PNM identifies periods of "excess emissions" in its quarterly reports as being caused by condensed water vapor (or any similar description) based on a combination of factors including available stack temperature data and the existence or nonexistence of some other identifiable cause of the "excess emission." (Huffman; Farley)

174. Because the COMS measurement line passes through the middle of the stack, if the condensing conditions are stratified throughout the gas stream (*i.e.*, because

some areas are slightly cooler than others) the effects on the COMS readings could vary even as compared to temperature readings. (Farley; Roberson; Nichols; PNM-1805; PNM-1806)

175. COMS reading of opacity that are caused by condensed, uncombined water vapor would not be read as opacity in a properly conducted Method 9 or as PM in a Method 5 test. (Farley; Nichols)

EPA Method 9 vs. COMS Equivalency

176. A number of Method 9 tests have been performed at San Juan during the period at issue in this case by either an NMED inspector or a PNM contractor. In some cases where Method 9 tests have been attempted, valid readings were not obtained as a result of intermingling of the plumes from several units. (Huffman; Farley; Roberson; PNM-1836)

177. A comparison of Method 9 data recorded on San Juan Unit 1 on May 12, 1998 to COMS data recorded over the same six-minute periods shows the following differences:

Min.	Method 9	COMS
1	Insufficient	12%
7	5%	12%

(Roberson; PNM-1833; PNM-1879)

178. A comparison of Method 9 data recorded on San Juan Unit 2 on May 12, 1998 to COMS data recorded over the same six-minute periods shows the following differences:

Min.	Method 9	COMS
1	Insufficient	15%
7	10%	12%

(Roberson; PNM-1833; PNM-1879)

179. A comparison of Method 9 data recorded on San Juan Unit 3 on November 16, 1998 to COMS data recorded over the same six-minute periods shows the following:

Min.	Method 9	COMS
3	Insufficient	6%
9	11%	6%
15	14%	6%
21	13%	6%
27	15%	6%
3	Insufficient	6%
9	17%	6%
15	13%	6%
21	11%	6%
27	9%	6%

(Roberson; PNM-1836; PNM-1879)

180. A comparison of Method 9 data recorded on San Juan Unit 4 on November 16, 1998 to COMS data recorded during the same six-minute periods shows the following:

Min.	Method 9	COMS

2	Insufficient	15%
8	13%	14%
14	11	15%
20	10%	16%
26	9%	18%
2	Insufficient	15%
8	Insufficient	19%
14	Insufficient	16%
20	Insufficient	21%
26	14%	30%

(Roberson; PNM-1836; PNM-1879)

181. A comparison of Method 9 data recorded on San Juan Unit 1 on June 28, 1999 to COMS data recorded over the same six-minute periods shows the following differences:

Min.	Method 9	COMS
1	Insufficient	21%
7	13%	20%

(Roberson; PNM-1844; PNM-1879)

182. A comparison of Method 9 data recorded on San Juan Unit 3 on June 29, 1999 to COMS data recorded over the same six-minute periods shows the following differences:

Min.	Method 9	COMS
3	Insufficient	8%

(Roberson; PNM-1844; PNM-1879)

183. A comparison of Method 9 data recorded on San Juan Unit 1 on July 20, 2000 to COMS data recorded over the same six-minute periods shows the following differences:

Min.	Method 9	COMS
5	Insufficient	13%
11	16%	12%
17	17%	13%
23	17%	16%
29	16%	13%
35	16%	12%
41	16%	14%
47	16%	10%
53	15%	10%
59	15%	8%

(Roberson; PNM-1859; PNM-1879)

184. A comparison of Method 9 data recorded on an Juan Unit 3 on July 21, 2000 to COMS data recorded over the same six-minute periods shows the following differences:

Min.	Method 9	COMS
5	Insufficient	10%
11	9%	10%
17	7%	11%

23	6%	10%
29	6%	8%
35	6%	9%
41	7%	9%
47	8%	10%
53	8%	10%
59	8%	8%

(Roberson; PNM-1859; PNM-1879)

185. A comparison of Method 9 data recorded on San Juan Unit 4 on July 20, 2000 to COMS data recorded over the same six-minute periods shows the following differences:

Min.	Method 9	COMS
4	Insufficient	7%
10	20%	7%
16	20%	7%
22	20%	7%
28	21%	7%
34	19%	7%
40	17%	7%
46	17%	8%
52	16%	9%
58	13%	7%

(Roberson; PNM-1859; PNM-1879)

186. There is a significant difference in the readings for San Juan Units 1, 3 and 4 obtained with Method 9 test as compared to the COMS readings for the same six-minute period. (Roberson)

187. The data from San Juan Units 1, 3 and 4 demonstrate that a COMS reading does not tell what a Method 9 would have read and that any particular COMS reading could be above or below a concurrent Method 9 reading by an amount sufficient to affect compliance determinations. (Roberson)

188. The differences between the Method 9 and COMS readings from one test to the next do not appear to follow any particular pattern and cannot be explained by any one cause. (Roberson)

189. The differences between the Method 9 and COMS reading at San Juan Units 1, 3 and 4 are consistent with the fact that the data are collected with two very different analytical measurement methods each of which has its own inherent biases and errors that could cause particular readings to be above or below the other. Those differences must be taken into account when determining whether a Method 9 would have recorded a possible violation of the applicable standard. (Roberson)

<u>CONCLUSIONS OF LAW</u>

Jurisdiction

1. U.S. District Courts have jurisdiction, without regard to the amount in controversy or the citizenship of the parties, over citizen suits brought under CAA § 304. CAA § 304(a).

2. Venue for any action alleging violation by a stationary source of an emission standard or limitation may be brought only in the judicial district in which the

source is located. CAA § 304(c)

3. This Court has jurisdiction over the parties to this proceeding with respect to Count I of the Plaintiffs' Complaint and venue is proper in the United States District Court for the District of New Mexico.

The Clean Air Act

4. Section 111 of the CAA authorizes the EPA to adopt "technology based" New Source Performance Standards ("NSPS") for "new sources" in listed industrial categories. CAA § 111 (PNM-1813A). New stationary sources must comply with any NSPS promulgated (or proposed) by the EPA for that source type as of the time the source commenced construction. CAA § 111(a)(2), (b)(4) (PNM-1813A)

5. Each NSPS must be achievable through application of the "best demonstrated controlled technology" (BDT) available at the time the standard was proposed. CAA § 111 (PNM-1813A) The NSPS are not health-based standards.

6. To be enforceable, NSPS must include a method for determining compliance. CAA § 111(h)(2) (PNM-1813A). The method for determining compliance with an emission standard is a substantive part of the standard and a change in that method can affect the level of performance required by the standard, even though the numerical portion of the standard has not changed. *Appalachian Power v. EPA*, 208 F.3d 1015, 1027 (D.C. Cir. 2000). *Clean Air Implementation Project v. EPA*, 150 F.3d 1200, 1203 (D.C. Cir. 1998); *Portland Cement Assoc. v. Ruckelshaus*, 486 F.2d 375, 401 (D.C. Cir. 1973); *Donner Hanna Coke Corp. v. Costle*, 464 F.Supp. 1295, 1305 (W.D. N.Y. 1979).

7. A source that satisfies the applicable NSPS upon initial commencement of

operation cannot be required to meet a more stringent NSPS, unless the source is subsequently modified. CAA § 111(a)(4), (b)(4) and (6) (PNM-1813A)

8. CAA § 111 authorizes EPA to delegate to states authority to "implement and enforce" the NSPS, but not to revise those standards. CAA § 111(c)(1) (PNM-1813A). EPA has delegated to the NMED the authority to enforce and implement, but not to revise, the NSPS.

The Applicable Opacity Standard and Its Elements

9. The NSPS for large fossil-fuel-fired boilers capable of generating more than 73 megawatts (250 million Btu per hour) which commenced construction after August 17, 1971, but before September 18, 1978, are codified in 40 C.F.R. Part 60 Subpart D. 40 C.F.R. §§ 60.40 and 60.40a (PNM-1813E)

10. The NSPS "General Provisions" that are applicable to all the NSPS, including specific procedures for determining compliance with those standards, are codified in Subpart A to Part 60. 40 C.F.R. §§ 60.1 - 60.19 (PNM-1813D)

11. Based on their size, fuel use, and the dates upon which construction was commenced, San Juan Units 1, 3 and 4 are regulated under the NSPS Subparts A and D.

12. Subpart D establishes a standard of performance for particulate matter (PM) that limits both PM and "opacity." 40 C.F.R. § 60.42(a)(1) (PNM-1813E). "Particulate matter" is "any finely divided solid or liquid material, other than uncombined water, as measured by the reference methods specified under each applicable subpart, or an equivalent or alternative method." 40 C.F.R. § 60.2 (PNM-1813D). Particulate matter is an air pollutant under the CAA.

13. "Opacity" is the "degree to which emissions reduce the transmission of

light and obscure the view of an object in the background." 40 C.F.R. § 60.2 (PNM-1813D). Opacity measurements are expressed in terms of percentage with one hundred percent (100%) indicating that the transmission of light is completely obstructed by the emissions, and zero-percent (0%) meaning that all visible light is allowed through the emissions. Opacity is not an "air pollutant" under the CAA or the New Mexico Air Quality Control Act.

14. Subpart D establishes a PM standard for coal-fired units of 0.10 lb per million Btu as determined by PM "performance testing" conducted using EPA "Method 5" under "representative conditions." 40 C.F.R. §§ 60.11(a), 60.40(a)(1), 60.46(a) and (b)(2) (PNM-1813E)

15. The Subpart D limit on opacity is "20 percent opacity except for one six-minute period per hour of not more than 27 percent opacity" as determined by EPA Method 9 and the procedures in § 60.11. 40 C.F.R. §§ 60.11(b), 60.42(a)(2) and 60.42(a) and (b)(3) (PNM-1813E).

16. The opacity standard is expressed, and COMS data are recorded under the NSPS, to the nearest 1 percent opacity. 40 C.F.R. § 60.13(h) (PNM-1813D). Accordingly, based on conventional rounding procedures, opacity readings of 20.50 percent or less cannot provide the basis for a finding of violation. (PNM-1810; PNM-1811).

17. Opacity readings of "portions of plumes which contain condensed, uncombined water vapor shall not be used for purposes of determining compliance with opacity standards." 40 C.F.R. § 60.11(e)(1) (PNM-1813D) Accordingly, opacity readings that are taken when there is condensed, uncombined water vapor in the stack

cannot provide the basis for a finding of violation.

18. "Uncombined water" is water that is physically (not chemically) adhered to a particulate matter or another substance and thus would evaporate when heated in a Method 5 sampling train.

19. The NSPS opacity standards, including the Subpart D standard, do not apply during periods of "startup, shutdown, malfunction, " as defined in § 60.2. 40 C.F.R. § 60.11(c) (PNM-1813D). Accordingly, opacity readings that occur during periods of "startup, shutdown, or malfunction" cannot provide the basis for a finding of violation.

20. San Juan Units 1, 3 and 4 are subject to a New Mexico regulation that establishes a PM limit of 0.05 lbs per million Btu for coal burning equipment with rated heat rate capacity greater than 250 million Btu. 20.2.14 NMAC. However, stationary combustion sources, like San Juan Units 1, 3 and 4, that are subject to a state limitation on PM are exempt from opacity regulation by the state. 20.2.61 NMAC.

21. Accordingly, the only opacity standard applicable to San Juan units 1, 3 and 4 is the Subpart D opacity standard.

The Compliance Method

22. To determine compliance with the Subpart D opacity standard, source owners and operators are required to conduct Method 9 tests with a minimum observation time of 3 hours (30 six-minute averages) during PM performance testing, or, at the source owner or operator's election, submit COMS data collected during the duration of the PM emissions testing. 40 C.F.R. § 60.11(b) and (e)(1) and (5) (PNM-1813D).

23. There is no provision in the NSPS authorizing the use of COMS data by

itself to determine compliance during periods other than PM performance testing. According to Subpart A, although COMS data may be considered "probative" of the actual opacity of an emission, they are not conclusive evidence, and Method 9 data are controlling even during periods when COMS data are submitted to determine compliance. 40 C.F.R. § 60.11(e)(1) and (5) (PNM-1813D; PNM-1813O; PNM-1816).

24. A source that records opacity above the 20 percent standard (whether with Method 9 or COMS) during PM performance testing without violating the PM standard is entitled to apply for "appropriate adjustment" of the opacity standard if the controls were properly operated to minimize emissions during the test and could not be adjusted or operated to eliminate the exceedance -- *i.e.*, if the opacity exceedances were unavoidable even with properly operated controls. 40 C.F.R. § 60.11(e)(6) (PNM-1813D; PNM-1816).

25. Opacity is not itself a concern under the NSPS unless it indicates an exceedance of the PM standard or improper operation of PM controls.

26. Despite explicit provisions establishing Method 9 as the compliance method and limiting the circumstances under which COMS may be used to determine compliance, Subpart A § 60.11(g) also states that the regulations do not preclude the use of other "credible evidence" or information to establish whether a source "would have been in compliance with applicable requirements if the appropriate performance compliance test or procedure had been performed." 40 C.F.R. § 60.11(g) (PNM-1813D; PNM-1813S).

27. Because the compliance test procedure specified for Subpart D is performance of a Method 9, "credible evidence" can only be used to establish a violation

if those data demonstrate that a Method 9 would have been failed had it been performed. 40 C.F.R. § 60.11(g) (PNM-1813D; PNM-1813S).

Continuous Opacity Monitoring Systems (COMS)

28. Subpart D sources must install and operate COMS at all times "except for monitor breakdowns, repairs, calibration checks, and zero and span adjustments." 40 C.F.R. § 60.13(e) and 60.45(a) (PNM-1813D; PNM-1813E)

29. The Subpart D COMS must meet the manufacturers' design, source installation criteria, and initial calibration and alignment requirements of PS-1. 40 C.F.R. § 60.13(d)(1) (PNM-1813D)

30. COMS installed after March 30, 1983, but before April 9, 2001, are subject to the 1983 version of PS-1 promulgated at 48 Fed. Reg. 13322. COMS installed before March 30, 1983 are subject to certain provisions of the 1983 version, but were not required by the revision to require any additional testing to show compliance with the revised version. 48 Fed. Reg. 13322 (PNM-1823)

31. PS-1 establishes initial performance specifications that define allowable error. 48 Fed. Reg. 13322 (18983) (PNM-1823).

32. Following PS-1 certification, the only frequent quality assurance required under Subpart A for the COMS is the daily calibration drift standard of twice the applicable performance specification of 2% (i.e., must be adjusted if the calibration has drifted by more than 4% opacity). 40 C.F.R. § 60.13(d) (PNM-1813D).

33. Although EPA has recently proposed additional regulatory quality assurance/quality control requirements for COMS that are used "to determine compliance," the NSPS currently does not impose any such standards. 68 Fed. Reg.

24692 (PNM-1875).

Excess Emissions Reporting

34. Any six-minute period in which COMS record data in excess of the 20 percent opacity standard must be reported as "excess emissions," even though the standard may not apply to the reading due to the "startup, shutdown, or malfunction" exclusion or other reasons. 40 C.F.R. § 60.46(g)(1) (PNM-1813E).

35. Subpart D sources are required to identify in those reports whether the periods of "excess emissions" coincided with periods of "startup, shutdown, or malfunction," to describe the "nature and cause of any malfunction (if known)," and to report causes and corrective action. 40 C.F.R. §§ 60.7(c) and 60.45(g)(1) (PNM-1813D; PNM-1813E).

36. Although "excess emission" reports are evaluated by the enforcing agency as an "indicator of the compliance status of the source," to determine if the source is complying with the "general duty" under § 60.11(d), and to otherwise target inspections, they are not, standing alone, used as a direct measure of compliance with the opacity limit. *See, e.g.*, 39 Fed. Reg. 32852 (1974) (PNM-1813M) 50 Fed. Reg. 52115, 53116 (1985) (PNM-1813N); PNM Exhibit 1830.

37. Nothing in PNM's certified "excess emissions" reports establishes the accuracy of the COMS data for directly determining compliance with the Subpart D opacity standard or establishes comparability of the COMS data to Method 9.

Operating Permit P062

38. The 1990 CAA amendments established an operating permit program for major stationary sources that requires the incorporation of all CAA "applicable [federal] requirements" under one permit issued by states under EPA approved programs. CAA

§§ 502, 504 (PNM-1813B).

39. Title V does not authorize the imposition of new substantive requirements by EPA or the states. 57 Fed. Reg. 32250, 32251 (1992) (PNM-1813Q).

40. The NSPS are an "applicable requirement" that must be incorporated into the Title V Operating Permit of any source subject to NSPS. 40 C.F.R. Section 70.2 (PNM-1813H)

41. When read together, Operating Permit P062 and NSR Permit 63-M-2 provide that opacity compliance is to be determined pursuant to 40 C.F.R. Part 60, Appendix A, which makes clear that the Subpart D opacity standard does not apply to during periods of "startup, shutdown, or malfunction" or to opacity due to condensed water vapor, and specifies EPA Method 9 as the applicable compliance method. (Plaintiffs' Ex. 2; PNM-1829)

42. Condition 3.4.2.1 of Operating Permit P062 reflects PNM's decision to use its COMS data to determine compliance with the opacity standard during the annual PM performance testing required under Condition 3.4.1.6 consistent with § 60.11(e)(5), but does not otherwise establish COMS as the conclusive method for determining compliance.

43. New Mexico does not have authority under the CAA to revise the Subpart D, NSPS, or its compliance methods. Only the Administrator can approval equivalent or alternative compliance methods. CAA § 111; 40 C.F.R. § 60.8(b) (PNM-1813A; PNM-1813D).

44. New Mexico law authorizes NMED to adopt standards of performance for sources, but limits those standards to being "no more stringent than but at least as

stringent as federal standards of performance." NMSA 1978, § 74-2-5.C (1992) (PNM-1813C)

45. Interpretation of the permit as establishing COMS data as the conclusive means of determining compliance for periods other than PM performance testing would be inconsistent with New Mexico law. NMSA 1978, § 74-2-5.C (1992) (PNM-1813C)

"Equivalency" of COMS and Method 9

46. Under the "credible evidence" rule, in order to establish a violation of the Subpart D opacity standard based on COMS data, Plaintiffs bear the burden of establishing for each alleged violation that a Method 9 test would have been failed had it been performed.

47. COMS readings in excess of 20 percent do not by themselves establish that an EPA Method 9 test would also be failed.

48. Method 9 explicitly recognizes that potential errors "must be taken into account when determining possible violations of applicable opacity standards." Method 9, Introductory material (PNM Exhibit 1813G). This is a fundamental element of Method 9 that must be applied when applying the "credible evidence" rule to Method 9.

49. In order to establish with COMS data that a Method 9 would have been failed, the Plaintiffs must establish at a minimum that the amount of the exceedance is greater that the potential cumulative measurement error of the COMS.

50. In order to establish with COMS data that a Method 9 would have been failed, the Plaintiffs must also establish that the amount of the exceedance is greater than the difference in readings between a recently calibrated COMS and the error allowed during certification of a Method 9 reader.

51. Because Method 9 requires that opacity readings be taken "in that portion of the plume where condensed water vapor is not present," 40 C.F.R. Part 60, Appendix A, Method 9, § 2.3 (PNM-1813G), in order to establish with COMS data that a Method 9 would have been failed, Plaintiffs must establish that the COMS were not reading condensed water vapor.

52. The combination of potential low Method 9 readings from a certified reader (up to 7.5% absolute error), the potential high bias of a PS-1 certified COMS as installed, the documented accuracy problems with San Juan's COMS, the data comparing San Juan's own COMS to Method 9, and the documented interference in COMS measurements by condensed water vapor are sufficient to demonstrate that Plaintiffs have not shown by means of the COMS data in PNM's "excess emissions" reports that it is more likely than not that a Method 9 would have been failed for any particular six-minute period in PNM's "excess emissions" reports.

Achievability of the Subpart D Opacity Standard

53. Because the CAA requires that NSPS be achievable with the technology upon which the standard was based, the Subpart D opacity standard must be achievable with an ESP.

54. Because EPA did not review opacity data collected under all operating conditions when it established the Subpart D opacity standard, EPA has not established that the Subpart D standard is achievable under all operating conditions with an EPS.

55. Because EPA did not review continuous opacity data collected with COMS when it established the Subpart D opacity standard, EPA has not established that the Subpart D standard is achievable during each six-minute period measured by a

COMS.

56. Because monitoring continuously with COMS under all operating conditions could result in many more exceedances than monitoring with Method 9 "once a day, or less," it is reasonable to require some adjustment of the standard to ensure that it is not more restrictive when enforced with COMS data. *National Parks Conservation Assoc., Inc. v. TVA*, 175 F.Supp.2d 1071 (E.D. Tenn. 2001).

57. EPA's failure to demonstrate the achievability of the Subpart D standard as measured at all times with a COMS creates inherent limitations on the lawful use of COMS data to establish violations under the "credible evidence" provisions on § 60.11(g).

58. Consistent with the provisions in § 60.11(e)(5) for establishment of an alternative opacity limit, the "credible evidence" rule cannot lawfully be used to establish a violation in cases where exceedances measured by the COMS could not be avoided by proper operation of an ESP. Any other result would render the NSPS unachievable.

59. In order to establish a violation of the Subpart D opacity standard using COMS as "credible evidence" of a Method 9 violation, Plaintiffs bear the burden of proving for each six-minute opacity reading in excess of the Subpart D standard that is not due to "startup, shutdown, or malfunction" that the exceedance nonetheless could have been avoided.

Conclusions Regarding Plaintiffs' Case

60. Plaintiffs have not met their burden of demonstrating based on PNM's "excess emissions" reports that a Method 9 would have been failed for any of the periods covered in Plaintiffs' complaint.

61. Plaintiffs' have not established that the opacity standard was violated.

Conclusions Regarding Liability For Individual Six-Minute Periods If A Second Part Of The Liability Phase Of This Trial Is Necessary

62. No individual six-minute COMS reading less than 20.50 percent opacity (*i.e.*, that could be rounded down to 20 percent using conventional rounding procedures) can provide the basis for liability in the second part of the liability phase of this case.

63. No individual six-minute COMS reading that is selected by PNM for exclusion as the allowed single six-minute period in the hour between 20 percent and 27.50 percent can provide the basis for liability in the second part of the liability phase of this case.

64. No individual six-minute COMS reading recorded under saturated stack conditions (*i.e.*, under conditions leading to condensed water vapor) can provide the basis for liability in the second part of the liability phase.

65. No individual six-minute COMS reading recorded during conditions of "startup, shutdown, or malfunction" can provide the basis for liability in the second part of the liability phase of this case.

66. In the two cases where PNM identified in its quarterly "excess emissions" reports a specific potential positive bias in the reported COMS data, no individual six-minute COMS reading during that period can provide the basis for liability in the second part of the liability phase of this case unless it exceeds the standard by more than the identified potential error.

67. No individual six-minute COMS reading can provide the basis for liability in the second part of the liability phase unless it exceeds the opacity standard by the potential absolute error allowed during Method 9 certification.

68. No individual six-minute COMS reading can provide the basis for liability in the second part of the liability phase unless it exceeds the opacity standard by cumulative potential positive system measurement error of COMS.

69. No individual six-minute COMS reading that did not occur during “startup, shutdown, or malfunction” can provide the basis for liability in the second part of the liability phase unless Plaintiffs’ demonstrate that the exceedance could have been avoided.

Respectfully submitted,

KELEHER & McLEOD, P.A.

BY: ____________________________

Arthur O. Beach
Richard L. Alvidrez
P.O. Drawer AA
Albuquerque, New Mexico 87103
(505) 346-4646
(505) 346-1370 (fax)

Henry V. Nickel
Lauren E. Freeman
HUNTON & WILLIAMS
1900 K Street, N.W.
Washington, D.C. 20006

(202) 955-1500
(202) 778-2201 (fax)

Attorneys for Defendant Public Service Company of New Mexico

Robert H. Clark
Chief Counsel, Operations
PUBLIC SERVICE COMPANY OF NEW MEXICO
2401 Aztec N.E., MS-Z250
Albuquerque, New Mexico 87107
(505) 855-6380

CERTIFICATE OF SERVICE

THIS WILL CERTIFY that on November 3, 2003, a true and correct copy of PNM's Proposed Findings of Fact and Conclusions of Law was e-mailed and mailed first class through the United States Postal Service to:

Steven Sugarman, Esq.
BELIN & SUGARMAN
618 Paseo de Peralta
Santa Fe, New Mexico 87501

George Hays, Esq.
236 West Portal Avenue, #110
San Francisco, California 94127

Reed Zars, Esq.
910 Kearney Street
Laramie, Wyoming 82070

____
Richard L. Alvidrez

Jec2829